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1. What is an LED upgrade? For which applications LED upgrade bulbs are available?

   It's a solution for the drivers who want to upgrade their car lights from halogen/conventional bulbs to LED. The ranges that have been developed are for all cars functions, interior and exterior lights.

2. What are the advantages of using an LED upgrade bulb over a Halogen bulb?

   The advantages of an LED upgrade are numerous:

   - **Upgrading to latest technology at affordable cost** without needing to replace full headlamp or purchasing a new full-LED car
   - **Longer lifetime:** You will benefit from a higher lifetime (approx. 5x longer lifetime), meaning cost saving of replacing conventional bulbs every 1-3 years
   - **Bright white light:** You will have stylish white lighting to give a refreshed look to your car
   - You will get better visibility on the road for more safety for you and other drivers

3. Can I upgrade my car equipped with Xenon bulb to LED upgrade bulb?

   No, Philips only offer the upgrade from halogen-based headlights to tested and safe Philips LED HL bulbs.

4. Can I save money by switching to LED upgrade?

   Yes, Philips LED upgrade bulbs has an extended lifetime, which means you save the cost and hassle of frequent bulb replacements A standard Halogen has 500 hours of a lifetime and an LED, for example, Ultinon Pro9000 has a lifetime of 5000 hours. Besides, a LED bulb uses substantially less energy (e.g. halogen H4 consumes 55W where a LED-HL [≈H4] drawn around 20W).

5. Are Philips LED upgrade ranges environment friendly?

   Yes, Philips LED upgrade ranges contributes to environment protection by:

   - Significant energy-saving, consuming less overall resources and emitting less CO_2
   - Fully compliant with RoHS/REACH, which means no hazardous materials which are harmful to the environment
   - Long service lifetime means the elimination of unnecessary replacement related waste and system costs while reducing overall resource consumption.

6. What is the right color temperature for LED? One reads the higher the color temperature the better?

   5800K is the CHOICE of OEMs, to maximize eye comfort while driving at night. This reduces fatigue and the risk of eye strain and makes driving in the dark a safer, more pleasant experience.

   The higher the color temperature (Kelvin) the better the visibility is incorrect information marketed by many LED replacement bulb brands. The right color temperature should provide optimal contrast for safe driving.

Our internal testing of these unreliable LED bulbs has shown that these bulbs do not stay at stable color temperature throughout their operation. Example: If they are marketed at 6000K (cool white), they move to 7000K (bluish color) during the operation which is very unsafe for driver & other road users.

7. Some LED upgrades in market offer 50,000 hours lifetime for HL whereas Philips offer 5000 hours only? Why there is a big difference?

Many LED replacement bulb brands claim 10,000h, 20,000h or even 50,000h of LED bulb lifetime. This is completely misleading to the customer. They are communicating the life of an **LED chip itself** measured at an ambient environment of 25 degrees and not the life of an **LED bulb itself**.

The most critical piece of an LED bulb is the PCB (Printed Circuit Board) because it heats a lot and if not cooled down properly, it affects the performance of the LED bulb. The lifetime of an individual component doesn't matter, what matters is the lifetime of the product overall. That's why, at Philips we offer 3-years and 5-years of warranty for our LED products for customer's peace of mind.

Further information at **philips.com/auto-warranty**

8. What are these technology – AirBoost, AirCool and SafeBeam?

Philips **AirBoost** and **AirCool** technologies: the latest thermal management systems with active and passive cooling systems for increased lifetime and performance. We use passive cooling when the spacing within the headlamp is big enough to effectively dissipate the heat without the risk of decreased performance. Also, depending on the performance of the LED, we use either passive or active cooling. For example, on LED-HL [≈H7] headlamp, the optic is generally smaller than LED-HL [≈H4]), so the heat dissipation needs to be active to effectively direct the hot air away from the back of the LED.

Philips **SafeBeam technology**: projects light exactly where you need it for your safety (no glare for oncoming racers). The Figure of Merit (FOM => light projected on the road) is in concordance with ECE R112.

Watch our various episodes on **philips.com/LEDvideoguide** to know about "basics of car safe lighting".

9. Why most of the competitors are using Lumileds LED chips?

Lumileds LED chips are today the best performance chips you can find on the market in terms of performance and durability. On top, they are today the smallest chips you can get: 16x20mm instead of general 35x35mm or even 50x50mm which was for a long time the automotive standard. Thanks to this size, they can almost perfectly match the shape and positioning of the filament of the halogen bulb they replace. Please note, for the Ultinon Pro9000 and Ultinon Pro5000, we use automotive grade OEM LED chips, which are used by world's major car manufacturers and exclusively by Lumileds in automotive aftermarket.

10. One reads that LED lamps strongly dazzles the oncoming traffic. How is it for Philips LED upgrades?
    Safety of the driver and other road user is key for us. Therefore, our bulbs feature Philips SafeBeam Technology, producing the best useable beam and glare-free pattern. Drivers get the light exactly where they need it on the road without dazzling oncoming vehicles.

    The Figure of Merit (FOM => light projected on the road) is in concordance with ECE R112.

11. One reads that it is important to look for compact LED bulb? Why?
    Today's headlamps have limited space. Therefore, it is important to look for compact size LED lamps. Philips LED upgrade bulbs are super-compact. They ensure compatibility with a wide range of car models.

LED upgrade benefits

1. How do I choose which Philips LED upgrade headlight bulb is good for my car?
   Visit "Find the right LED bulb" on Automotive Support **philips.com/automotivesupport**

2. How is Philips LED upgrade different from the competitor? Why should I buy this product?
   Philips Automotive Grade Quality products are designed and developed following strict quality-control processes, leading to consistently high production standards. All our products are best-in-class quality, which allows us to be an Original Equipment Manufacturer (OEM).

We use the highest quality raw materials to manufacture our products. At every stage in production, we test the bulbs to the highest specifications for improved quality and the safety of our customers.

Some competitors may not be able to prove their performance claims, both in terms of lumen output and product lifespan. They may indicate the specifications of the LED chips rather than the full bulb itself, for example:

- **Lumen output**: say an LED chip gives up to 1,000 lm. If the LED upgrade bulb has 8 chips in total, they might claim a total lumen output of 8 x 1,000 lm = 8,000 lm. But the lumen output cannot be calculated like this, it needs to be measured with specialist equipment.
- **Lifetime value**: An LED chip can usually last up to 30,000 hours at 25°C (room temperature). However, what matters is how the LED chip is integrated within the bulb, and how the generated heat is managed when the lamp is in use. These variables can change the lifetime of the LED chip (so a claim of a 30,000-hour lifespan could be misleading in an inferior product).

3. What is the difference between LED-FOG [≈H8/H11/H16] and LED-HL [≈H11] low beam?

The LED-FOG [≈H8/H11/H16] has been developed to fit in 3 different fog optic type: H8, H11, and H16. Therefore, the performance has been optimized for this specific application. On the other, the LED-HL [≈H11] Low Beam (LB) version is more performing to rightly project light on the road for low beam applications only.

4. How would I recognize fake Philips LED bulbs from a genuine?

Whenever you purchase a Philips LED upgrade bulb for your headlights, you can check the authenticity using the QR code provided on the top the LED package. This is an insurance for you that you get a genuine Philips LED. Please visit Philips authenticity **philips.com/authenticity-check** for more information. Authenticity check available for: Ultinon Pro6000 HL and Ultinon Pro9000 HL.

LED upgrade installation

1. How can I verify which LED to use to replace my old bulb?

Simply use the section “Find the right lamp for your car” on the Philips website to find out which lamp type you need. Each type is communicated with the corresponding ECE name. Here below some examples in the comparison table between halogen and LED upgrade:

Halogen type	**LED name**
H4	LED-HL [≈H4]
H7	LED-HL [≈H7]

H8/H11/H16	LED-FOG [≈H8/H11/H16]
H11	LED-HL [≈H11]
HB3/4	LED-HL [≈HB3/4]
HIR2	LED-HL [≈HIR2]
H1	LED-HL [≈H1]
Festoon T10,5x30mm	LED-FEST [30mm]
Festoon T10,5x38mm	LED-FEST [38mm]
Festoon T10,5x43mm	LED-FEST [43mm]
W5W	LED-T10 [≈W5W]
W16W	LED-T16 [≈W16W]
W21W	LED-T20 [≈W21W]
W21/5W	LED-T20 [≈W21/5W]
W21W	LED-T20-RED [≈W21W]
W21/5W	LED-T20-RED [≈W21/5W]
W21W	LED-T20-AMBER [≈W21W]
P21W	LED-RED [≈P21W]
P21W	LED-AMBER [≈P21W]
P21/5W	LED-RED [≈P21/5W]
-	LED-CANbus [≈5W]
-	LED-CANbus [≈21W]

2. How do I ensure if the Philips LED headlight upgrade is compatible with my car?

Philips headlight upgrade is compatible with a wide range of vehicle models. We have tested some popular car platforms. Please refer to our compatibility list **philips.com/LEDcompatibility-check**. Please note if you cannot find your model type in the list, it doesn't mean the LED bulb doesn't fit in your car. You can still install the bulb in your car. We're continuously working to expand our compatibility list for your convenience. You can simply contact our Philips Consumer Service Desk with your model details and they can guide you.

3. What is CANBus? How do I know if I need one?

When upgrading your car to LED upgrade bulbs, a few challenges may occur such as an error message on the dashboard, flickering, or a dimming effect. These error messages don't mean the LED bulb itself is faulty. These are common errors when upgrading to LED technology.

Therefore, we have developed smart solutions to overcome those challenges. Philips' unique CANbus adapters ensure the vehicle's lighting systems function smoothly, for reliable electrical performance over time.

To know if you need one, please refer to our compatibility list **philips.com/LEDcompatibility-check**.

Please use Philips Adapter CANbus to remove inaccurate error message on the dashboard and Philips Light Repair CANbus* to remove flickering issue.

**Philips Light Repair CANbus is directly integrated into our new-generation LED bulbs (Ultinon Pro9000 and Ultinon Pro5000). No need for additional CANbus to remove flickering! However, in some rare cases, an additional light repair CANbus might be required to eliminate the flickering completely.*

4. How do I know if my car has "bulb failure detection" system?

   Please check the user manual or disconnect the Halogen bulb and start your car, activate the related light function and look for a warning signal on the dashboard.

5. Is it mandatory to use an additional CANbus while fitting LED?

   No, it is not mandatory to use CANBus as it is not required in all cases. It is only recommended if your car is equipped with a bulb detection failure system. In that case, you might face an inaccurate warning signal on the dashboard after upgrading to LED. To avoid this error, you would need to install CANBUS Adaptor. you're facing a flickering issue, then a Light Repair CANBus might be required to remove the flickering issue.

6. What is Connector ring? How do I know if I need one?

   Almost every car model has a different type of socket in which halogen bulbs are secured. When upgrading from halogen bulbs to LED, you may need a connector ring to secure the LED bulbs inside the headlamp.

   Every Philips HL upgrade is already supplied with a connector ring, type A. Usually, this is sufficient for most car models. However, for some car models, a special Connector ring is needed. To know if your car needs a special connector ring, please refer to our compatibility list **philips.com/LEDcompatibility-check**. If you cannot find your car model in the list, please contact our Philips Consumer Service Desk.

   To buy the right connector ring fitting your car model, please contact your nearest Philips dealer or contact our Philips Consumer Service Desk.

7. Is it mandatory to use an additional connector ring while fitting LED?

   No, it is not mandatory. Every Philips HL upgrade bulb is supplied with a connector ring type A, which is usually sufficient for most car models. However, for some car models, a special Connector ring is needed. Please refer to our compatibility list here to know which ring type is needed for your car model. If you cannot find your car model in the list, please contact our Philips Consumer Service Desk.

   To buy the right connector ring fitting your car model, please contact your nearest Philips dealer or contact our Philips Consumer Service Desk.

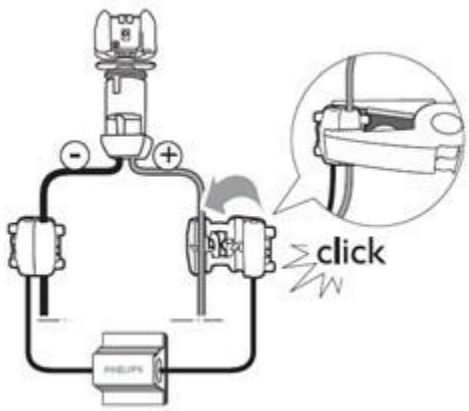
8. Why Philips LED don't have integrated CANbus?

   We chose to have separated CANbus for 2 reasons:

   - Most of the time the CANbus is not necessary to install
   - When needed, it's better to have it separated than integrated because if integrated inside the bulb it makes the lamp bigger and too expensive.

9. How do I install a CANbus adapter?

   If your car has a dashboard error message, experiences fast flash or goes in limp mode upon installation of an LED bulb, you may consider to purchase and install a Philips CANbus adapter solution. See the below image for installation instructions of the Philips CANbus adapter:



10. Have the lamp been tested for radio interference?

    Yes, the lamps are tested for radio interference and meet all relevant standards.

11. Does Philips LED upgrade lamps have polarity issue?

    No, Philips LED upgrade bulbs are polarity free.

12. After installation of the LED, my car show fast flash errors as if my light is out or broken?

    Error messages appear because the LED bulb wattage is much lower than conventional bulbs, which can make an outage warning system unable to detect the bulb. If your car shows fast flash upon installation of an LED bulb, you may consider to purchase and install a Philips Light Repair CANBus for low & high beam application.

13. After installation of the LED, my car does not start. What should I do?

    After the installation of LED bulbs, some cars go in limp mode. Thankfully this rarely happens and the issue can be resolved. First, verify that the limp mode is being caused by the LEDs by replacing them again with the incandescent bulbs. If the car works fine, the limp mode was most likely caused by the LED bulbs. To remove this issue, you may consider to purchase and install a Philips Adaptor CANbus.

14. Is the 24V festoon equipped with CANbus?

    They are no CANbus with the 24V festoon, because it's not needed on all the vehicles. If a CANbus is needed to avoid error message or blinking, please use the Philips 21W CANbus.

15. Is it possible to use the 21W CANbus for 24V LEDs? If yes, how many per lamps is required?

    Whether it's Philips CANbus 5W or 21W, they are not specifically dedicated to one application reference. Their purpose is to increase the wattage of the LED to avoid inaccurate error message on the dashboard, to avoid LED flashing when turned on and to prevent the turn indicators to blink faster than they should.

16. Which CANbus adapter do I need: 5W or 21W?

    The 5W CANbus is used for interior applications, and license plate lighting. The 21W CAN-bus is used for exterior applications such as position light, low/high beam lights.

    Always refers to the original wattage of the halogen/conventional lamp. As an example, a P21W usually draws 21W, when our LED-RED [≈P21W] has a wattage of 1.9W. The gap is then 21W-1.9W = 19.1W. This means that to compensate this gap of wattage, you should use a Philips 21W CANbus.

17. Even after installing LED with CANbus adapters, I still get an error message or flickering, what should I do?

    Even after proper installation of the LED upgrade and the CANbus adapter to remove any flickering and/or error message on the dashboard, you still get the mentioned issues, it is best to go back to the original halogen bulbs and ask for reimbursement at your dealer.

18. How can I avail for extended warranty?

    We offer a 3-years and 5-years warranty for Ultinon Pro5000 and Ultinon Pro9000 HL products respectively. The warranty applies only to non-commercial applications and is applicable for European union countries only. For other countries, local warranty standard applies. Visit **philips.com/auto-warranty** for further information.

Legislation on LED upgrade

1. One reads that Philips made the upgrade from halogen to LED legal on public roads in 2020? When and where was it?

   Since July 2020, Korean drivers have been able to upgrade their headlights from halogen to LED following approval of the second-generation Philips Ultinon Essential. Developed by Lumileds, the bulb brings superior LED brightness with a stylish white light.

   Philips Ultinon Essential gen2's homologation in July (H7 bulb size) broke new ground for the use of LED headlamps on public roads in Korea. For the first time anywhere, motorists can legally fit an H7-compatible LED bulb to any existing car model and drive on the national road network. And Korean motorists' upgrade options expanded further in October with certification of the second-

generation Philips X-treme Ultinon LED, delivering even more brightness and driving enjoyment. No other bulb-maker today offers so much choice in road-legal upgrade LED lighting.

With a strong track record of performance upgrades for halogen headlights, Philips automotive lighting solutions lead the way for innovation and added value. The approval of Philips Ultinon Essential gen2 in Korea builds on this, harnessing Lumileds LED expertise to make upgrading from halogen to LED legal on public roads in a new world-first.

2. Why is LED upgrade technology still not legal on public roads in the European Union (EU)?
   Philips LED upgrade range has been designed for headlight units certified for halogen/conventional bulbs. EU member states have not yet adopted the legislation required to legalize LED upgrade bulbs, so they cannot be used on public roads in the EU.

3. When is expected that LED upgrade will be fully road legal?
   Even though Philips follows the standards and ensure safe bulb for driver and other road users. The regulation for LED upgrade bulb is not defined in Europe. We're monitoring the situation.

4. One reads that upgrading from Halogen bulb to LED bulb is now legal in Germany? Is it correct?
   Yes, after launching road-legal LED bulbs in Korea, Philips has brought the expertise to German public roads with Philips Ultinon Pro6000 LED headlight bulb. The bulbs are homologated by the country's Federal Motor Transport Authority (KBA) for selected vehicle models. Visit **philips.de/LED-strassenzulassung** for further information.

5. What are the legal risks if I drive with LED upgrade bulbs on a public road?
   The risks vary from one country to another, and depending on local law the sanctions may for instance include: A fine and/or having to change back to certified, non-LED bulbs. Your car might fail its mandatory inspection.

6. Why are LED upgrade bulbs intended for rally and race track?
   Except on cars already fitted with LED lights by the manufacturer, it is not legal to replace exterior halogen bulbs by LED upgrade bulbs in vehicles used on public roads. As LED upgrade bulbs are not authorized on public roads, they can only be used on private roads or tracks.

7. Will a car with LED upgrade headlight bulbs pass its mandatory inspection?
   Some countries have a mandatory inspection that determines if the car is fit to drive on the road. The Philips LED upgrade range has been designed to best replace the original conventional technology on the car without any modifications to the vehicle. Despite the superior performance of Philips LED upgrade bulbs, your vehicle may not pass the inspection with LED upgrade installed because the bulbs are not yet certified for use on public roads.

8. Why now sell LED upgrade bulbs in countries previously considered "no trade"?
   When we first introduced LED upgrade bulbs, we decided on a limited launch. After two years' experience of selling LED upgrade bulbs in certain EU countries, we now feel that the time has come to open up sales to other countries as well. Although regulations have not changed, we

believe that we have provided our customers with sufficient information to confidently sell LED retrofit bulbs.

9. What is the specific regulation that LED upgrade bulbs must conform to?

   Today the retrofitting of Halogen, Xenon and LED bulbs is not allowed by existing legislation. In the EU, automotive parts must be certified to UNECE specifications for use on public roads. Current ECE certifications only apply to Halogen, Xenon and LED bulbs installed in new vehicles:

   - ECE R37 for OEM halogen
   - ECE R99 for OEM Xenon
   - ECE R128 for OEM LED

   However, there are no specific homologation requirements for, or restrictions to, using LED upgrade bulbs on private roads.

10. What is the impact of R128, and why do Philips LED upgrade bulbs not fulfill these requirements?

    ECE R128 is the certification for LED optics, meaning that the headlamp has been developed with LED as its light source. The regulation doesn't apply to LED retrofit used to replace halogen bulbs certified under ECE R37.

11. Who bears responsibility when a consumer is found with LED upgrade bulbs on a public road?

    Assuming the consumer has been properly informed of the restrictions that apply and that the consumer has installed the LED retrofit bulbs themselves, it is in principle the consumer's sole responsibility. However, local authorities may take action over the sale of LED retrofit bulbs for use on public roads. The extent of that action depends on the powers given to the local authorities.

12. Are there any legal LED upgrade bulbs available? (Other suppliers sell LED upgrade bulbs, claiming they are legal.

    No LED retrofit products are currently legal on public roads in the EU unless the bulbs are sealed in their housings and both bulb and housing have been approved for use together.

13. What do these symbols on the packaging mean?

	This symbol indicates that the product is not suitable for public roads. This means that it can only be used on "closed" roads.
	This symbol shows that the product has not been approved according to the ECE R37 regulation on halogen bulbs. We show the halogen regulation because, although an LED retrofit bulb is designed to replace the halogen bulb in the very same headlamp unit, that does not mean the LED retrofit bulb is ECE R37- approved.

14. What does the following text mean: “It is your own responsibility to ensure that the use of LED upgrade lights complies with relevant local legislation”?

    This text is intended to ensure you use LED upgrade bulbs correctly and in line with local laws. Local legislation is subject to change, so it is essential that that you check whether the product can be used where you are.

15. Where can I buy LED upgrade bulbs?

    Please check with your local representative or on our website **philips.com/LED-bulbs**